CLAIMS

1. Process for manufacturing retroreflective printed material with a flexible printing process, without using pollution products and effluence, said process comprising the steps of:

(a) partially embedding, in a support layer (2) of paper or polymer foil, a monolayer (20) of transparent glass microspheres and coating a reflecting layer (4) over a free surface of the microspheres (1);

(b) applying a thin coating layer (5) of a dry bi-component polyurethane product;

(c) while the polyurethane layer (5) is partially cured, applying a transfer printed support (6) and transfer an image from the support (6) to the microspheres (1) with a calender (29);

(d) laying an aluminium film (7) by vacuum deposition;

(e) coating a bi-component polyurethane layer (8) of a wet substance and drying the layer (8);

(f) while the polyurethane layer (8) is partially cured, applying a support fabric (9);

(g) stripping away the support layer (2) of the microspheres (1) and curing the fabric (9) covered with the printed microspheres (1).

2. Process for manufacturing a printed retroreflective material according to claim 1, characterized in that the printed design to be transferred is a sublimate pigments design printed on a paper base.

3. Process for manufacturing a printed retroreflective material according to claim 1, characterized in that the printed design to be transferred is a printed design on a polymer carrier film supported by a release paper or a polymer base.

4. Process according to claim 1, characterized in that the layer (20) of microspheres (1) layer is deposited upon an acrylic auto-adhesive film (2).

5. Process according to claim 1, characterized in that the layer (20) of microspheres (1) layer is deposited upon a polyethylene thermo-adhesive film (2).

6. Process according to claim 1, characterized in that:

(a) the first layer of polyurethane is a water-based dispersion polyurethane and the second polyurethane layer is a bi-component solvent solution polyurethane, in case an acrylic auto-adhesive film (2) is used for the microspheres (1),

(b) the first and second layer of polyurethane are in a solution of organic solvents if a polyethylene thermo-adhesive film (2) is used for the microspheres (1).

7. Process according to claim 1, characterized in that the temporary layer (20) of microspheres (1) is directly thermo-printed with sublimate pigments designs without alternatively the step of coating with a dielectric mirror (4) or the step of vacuum deposition of the aluminium film (7).

8. Process according to claim 7, characterized in that, when the coating with aluminium (7) is omitted, the second polyurethane coating is colored so to obtain an aesthetic combination between the printed image and the colored polyurethane resin.

9. Process according to claim 1, characterized in that said microspheres (1) are embedded into said polymeric layer (2) down to a depth included between 40% and 50% of their average diameter.

10. Process according to claim 1, characterized in that said thin layer (5) is equal to about 4 g/m^2.

11. Process according to claim 1, characterized in that said step (c) of transferring the support (6) to the surface of the microspheres (1) with a calender (29) is carried out at a temperature included between 100°C and 180°C.

12. Process according to claim 1, characterized in that said bi-component polyurethane (8) is coated with a thickness of about 125 microns of a wet substance and is dried at about 80°C.

13. Process according to claim 1, characterized in that said step (g) of curing is carried out at a temperature of about 150°C.